

As compared with the chart of the preceding month, December, 1887, the eastern limit of the Newfoundland fog-belt has extended about five degrees, and the southern limit remains about the same. No isolated fog-area appears off the southeast edge of the Banks, however, as in December. To the southward of Nova Scotia fog was observed nearly three degrees farther south than in the preceding month, and on a corresponding number of dates, while along the coast of the United States fog-areas were encountered about three degrees farther south than during December.

On the dates for which fog was reported near Newfoundland the meteorological conditions were as follows: Although no fog was reported in this region until the 15th instant, the atmospheric conditions were apparently favorable for its precipitation on the 3d, 8th, and 11th. On the first mentioned date a barometric depression passed eastward north of the Banks, and the non-development of fog was probably due to unusual influences exerted by an area of low pressure which moved northeastward east of the Banks during the first three days of the month, causing northwesterly winds over the fog-region until the immediate presence of the depression which

advanced from the westward. On the 7th and 8th similar conditions prevailed. On the 11th the conditions were favorable for fog, although none has been reported. During the 15th, 16th, and 17th fog was encountered off the eastern edge of the Banks, with easterly winds attending the presence to the southward of an area of low pressure. During the 18th and 19th the passage of a barometric depression from the middle Atlantic coast to Newfoundland caused south to southeast winds and fog over the Banks. On the 24th the conditions were favorable for fog, but none has been reported. During the 27th, 28th, and 29th the presence of a depression over the Gulf of Saint Lawrence caused southerly winds and fog, and on the 31st south to southeast winds and fog were reported off the eastern edge of the Banks. On the two dates, the 2d and the 24th, for which fog was reported south of Nova Scotia, the barometric pressure was low and southerly winds prevailed, attending the presence over Nova Scotia or New Brunswick of areas of low pressure. For the five dates, from the 12th to 16th, inclusive, on which fog was reported off the coast of the United States, the winds were variable or anti-cyclonic, and the barometric pressure abnormally high.

TEMPERATURE OF THE AIR (expressed in degrees, Fahrenheit).

The distribution of mean temperature over the United States and Canada for January, 1888, is exhibited on chart ii by dotted isothermal lines. In the table of miscellaneous data are given the monthly mean temperatures, with the departures from the normal, for the various stations of the Signal Service. The figures opposite the names of the geographical districts in the columns for mean temperature, precipitation, and departures from the normal, show respectively the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the departure is below the normal, and subtracting when above.

In the middle and southern Rocky Mountain slopes, the south Atlantic and east Gulf states, and in the eastern part of the west Gulf states, the month of January was warmer than the average, but the departures from the normal temperature in the districts named did not exceed 4° and at most stations were less than 2°.

In all other districts the month was colder than the average, and it may be rated as an exceptionally cold one throughout the northern portions of the country. In New England, the upper Mississippi and Missouri valleys, and in the northern and middle plateau districts, the departures from the normal temperatures ranged from 8° to 12°, and these marked departures are shown by comparison with normals of the oldest established stations of the Signal Service. North of the fortieth parallel the deficiencies in the mean temperatures have nowhere been less than 4°, except over portions of the eastern slope and the Lake region and in the upper Ohio valley.

The following are the most marked departures from normal temperatures at Signal Service stations:

Above normal.	Below normal.
Pensacola, Fla..... 0.8	Winnemucca, Nev..... 12.3
Las Animas, Colo..... 3.6	Helena, Mont..... 11.7
Montgomery, Ala..... 3.1	La Crosse, Wis..... 11.4
Atlanta, Ga..... 3.0	Davenport, Iowa..... 11.3
Fort Davis, Tex..... 3.0	Des Moines, Iowa..... 11.1
Santa Fé, N. Mex..... 2.7	Saint Paul, Minn..... 10.9
Cedar Keys, Fla..... 2.3	Boisé City, Idaho..... 10.3
Chattanooga, Tenn..... 2.1	Dubuque, Iowa..... 10.0

RANGES OF TEMPERATURE.

The monthly and the greatest and least daily ranges of temperature at Signal Service stations are given in the table of miscellaneous meteorological data, and the extremes below. As usual the ranges were greatest over the region between the Mississippi and the Rocky Mountains. They vary from 75° to 105° in the upper Mississippi and Missouri valleys and in the

northern and middle Rocky Mountain districts; the least monthly ranges occur along the Pacific coast, where they generally vary from 30° to 40°.

Greatest.	Least.
Fort Laramie, Wyo..... 105.5	Key West, Fla..... 22.5
Poplar River, Mont..... 100.8	San Diego, Cal..... 31.5
North Platte, Nebr..... 100.8	San Francisco, Cal..... 34.1
Fort Custer, Mont..... 99.1	Fort Bowie, Ariz..... 35.8
Fort Maginnis, Mont..... 99.0	Los Angeles, Cal..... 40.1
Denver, Colo..... 96.3	Tatoosh Island, Wash..... 41.4
Rapid City, Dak..... 95.7	Port Angeles, Wash..... 42.0

The greatest daily range of temperature for the whole country was 66° at Helena, Mont., and the least 1° at Shreveport, La. Daily ranges exceeding 60° occurred at Fort Maginnis, Helena, and Poplar River, Mont., Denver, Colo., and Abilene, Tex.; daily ranges of 3° or less occurred at Albany, N. Y., Leavenworth, Kans., Galveston, Tex., Shreveport, La., Pike's Peak, Colo., and Astoria, Oregon.

LOW TEMPERATURES.

The following notes on the extremely low temperatures of January have been received:

California.—Sacramento: a minimum temperature of 19° was recorded on the 14th; this is the lowest recorded since the establishment of the Signal Service station on July 1, 1877, and it is also the lowest known since January 21, 1864, when a similar temperature was observed by Dr. Logan. Between the 15th and 18th ice on streams, etc., was sufficiently strong to bear the weight of persons, an unusual occurrence for this region.

Georgetown, El Dorado Co.: the minimum temperature on the 14th, 11°, was the lowest ever known to have occurred at this place. Rose bushes that had been set out for the last twenty years and that were never before injured had their foliage completely destroyed.

Fort Bidwell: the lowest temperature ever known at this place occurred between 4 and 6 a. m. on the 14th, when a minimum of —26° was recorded.

San Francisco: a minimum temperature of 29° was recorded on the morning of the 15th, it being 4° lower than any previously observed at this place since the establishment of the Signal Service station in March, 1871. Ice formed to a thickness of four inches.

Willows, Colusa Co.: the night of the 15th was the coldest experienced during the last fourteen years.

Dr. J. B. Trembley, of Oakland, reports: "the weather from the 8d to the 18th was the coldest ever observed by American settlers in California."

Nicolaus, Sutter Co.: the unusually cold weather during the month caused much damage to plants and trees.

Idaho.—Boisé City: the minimum temperature on the 15th, —28°, is the lowest recorded at this place since the establishment of the Signal Service station in 1877; the loss of live stock on account of cold weather is already considerable; the frozen streams deprive the cattle of drinking water.

Iowa.—Mr. J. P. Walton, Muscatine, Muscatine Co., furnishes the following: "My meteorological record reaches back fifty years—to January 1, 1839. January 15, 1888, as a whole, was the coldest on record. Below is given a table showing the five coldest days for the period named:

Date.	Morning.	Noon.	Night.	Mean.
January 18, 1887	-30.0	0	-19	-18
February 10, 1888	-32.0	8	-11	-11
January 28, 1885	-34.5	2	-2	-12
January 7, 1887	-23.0	4	2	-8
January 15, 1888	-24.0	-11	-30	-21

"Note.—On the night of January 6-7, 1887, the temperature fell to -30° ."

Dr. Gustavus Hinrichs, Iowa City, furnishes the following, dated 21st:

"The continued extremely cold weather that has prevailed during the past ten days is very remarkable, and fortunately a rare feature in Iowa climatology. During the entire middle decade of January, 1888, the temperature has been zero, or below, on every night, on two of which it reached to within one and two degrees of the lowest temperature recorded by me in almost twenty years."

"The mean temperature of the second decade of January, 1888, is -4° . Only once during the twenty-eight years for which we have an unbroken series of reliable observations at Iowa City has any winter decade been as cold, namely, the first decade of January, 1864, which had a mean temperature of -7° , according to Professor Parvin's observations. Accordingly the second decade of January, 1888, and the first decade of January, 1864, have been the coldest ten-day periods in the history of Iowa for almost thirty years."

"It is extremely rare in Iowa for a decade to have a mean temperature below zero; we find but three other cases on record, namely, the first decade of January, 1870, -1° ; the first decade of January, 1884, -2° ; and the second decade of February, 1886, -2° . It will thus be noticed that during the twenty-eight years of observation at Iowa City there have been only five decades having a mean temperature of zero, or below."

"During the first eighteen years only one winter decade was so extraordinarily cold, but during the last ten years we have had four such instances. Reduced to equal length of time, this shows that such extreme cold has been seven times as frequent during the latter than during the former years of observation. This is another indication of the fact which I have repeatedly stated, namely, that in Iowa the winters are colder than formerly."

Minnesota.—Saint Paul: the daily mean temperature of the 15th, -28° , is 5° below the lowest recorded since establishment of station in 1870.

Nebraska.—Genoa, Nance Co.: the lowest temperature on record for the last fifteen years, -32° , occurred on the 15th.

Oregon.—Portland: the minimum temperature on the 15th, -2° , is the lowest recorded during the last sixteen years.

Roseburg: unusually low temperatures occurred on the 14th, 15th, and 16th; the minimum, -6° , on the 16th, was the lowest recorded since the establishment of the Signal Service station in 1878. The cold weather caused great suffering to stock.

Linkville: the lowest temperature ever known here, -15° , occurred on 7th.

Texas.—Brownsville: a minimum temperature of 28° was recorded on the 22d; this is the lowest since December 31, 1880, and January 1, 1881, when the minimum temperature of 18° was noted.

Fort Elliott, 15th: lowest temperature since establishment of station recorded this a. m., $-14^{\circ} 2$.

Abilene, 15th: at 7 a. m. the minimum thermometer registered 5° below zero, which is the coldest of which there has been any record, and colder than the oldest residents have ever known it.

Utah.—Salt Lake City: a minimum temperature of -17° was recorded on the 15th; this was the lowest on record since the establishment of the Signal Service station in 1874, with one exception, viz., -20° in January, 1888. The extremely cold weather of the second decade resulted in the loss of large numbers of sheep in the western part of the territory. The mean temperature for the first twenty days of this month is 16° , the lowest ever noted at this station, and is 12° below the normal for the last thirteen years. The following table shows the mean temperature for the first and second decades of January of each year since the establishment of the signal station here:

Year.	First decade.	Second decade.	Average.	Year.	First decade.	Second decade.	Average.
1875	30.6	29.1	29.8	1883	26.5	16.1	21.3
1876	34.3	27.2	30.8	1884	32.2	22.8	27.5
1877	33.4	28.8	31.1	1885	31.0	27.9	29.4
1878	21.9	30.2	26.0	1886	16.6	28.1	22.4
1879	26.2	26.4	26.3	1887	32.4	34.6	33.5
1880	31.5	31.2	31.4	1888	21.6	9.4	15.5
1881	25.5	35.4	31.0				
1882	32.2	15.4	23.8				
				Normal for 13 years	28.8	27.2	28.0

Washington.—Spokane Falls: a minimum temperature of -30° occurred on the 16th; this is the lowest on the records of the signal office, established in February, 1881.

FROST.

Frosts were of almost daily occurrence throughout the northern portions of the country. In the south Atlantic states they occurred from the 2d to 4th, 11th to 13th, 17th to 20th, 22d, and from the 26th to the 29th; in Florida, 3d, 18th, 19th, 20th, 26th, 27th, 29th, 30th; east Gulf states, 2d to 4th, 14th, 19th,

20th, 24th to 29th; west Gulf states, 1st, 3d, 7th to 24th, 26th to 29th; lower Rio Grande valley, at Rio Grande City, 2d, 15th to 17th, 19th.

DEVIATIONS FROM NORMAL TEMPERATURES.

The following table shows for certain stations, as reported by voluntary observers, (1) the normal temperatures for a series of years; (2) the length of record during which the observations have been taken, and from which the normal has been computed; (3) the mean temperature for January, 1888; (4) the departures of the current month from the normal; (5) and the extreme monthly means for January during the period of observations and the year of occurrence:

State and Station.	County.	(1) Normal for the month of Jan.	(2) Length of record.	(3) Mean for January, 1888.	(4) Departure from normal.	(5) Extreme monthly mean temperature for January.			
						Highest.		Lowest.	
						Am't.	Year.	Am't.	Year.
Arkansas.		0	Years	0	0	0	0	0	0
Lead Hill	Boone	30.2	6	31.9	+1.7	37.4	1882	24.2	1886
California.									
Sacramento	Sacramento	46.1	22	39.4	-6.7	54.5	1873	39.4	1888
Salinas	Montgomery	47.0	16	44.9	-2.1	52.4	1877	42.1	1883
Santa Barbara	Santa Barbara	53.4	5	49.0	-4.4				
Connecticut.									
Southington	Hartford	13.1	19	19.5	+6.4	20.4	1870	3.5	1872
Florida.									
Merritt's Island	Brevard	59.6	5	63.4	+3.8	64.8	1885	55.3	1886
Illinois.									
Aurora	Kane	16.5	9	8.3	-8.2				
Collinsville	Madison	25.0	8	22.8	-2.2				
Galesburg	Pope	31.2	9	29.6	-1.6				
Greenville	Bond	27.5	9	21.6	-5.9				
Mattoon	Colas	24.3	8	23.0	-1.3				
Peoria	Lee	16.1	9	11.1	-5.0				
Rockford	Peoria	24.0	32	18.5	-5.5				
Riley	McHenry	17.2	25	8.1	-9.1				
Rockford	Winnebago	16.0	16	9.1	-6.9	33.9	1880	6.6	1875
Sycamore	De Kalb	13.7	7	10.3	-3.4				
Indiana.									
Connersville	Fayette	22.6	6	25.0	+2.4				
Lafayette	Tippecanoe	22.3	9	18.6	-3.7				
Logansport	Cass	25.0	34	20.0	-5.0	43.0	1880	10.5	1875
Mauzy	Rush	21.1	8	21.9	+0.8				
Spiceland	Henry	26.0	34	24.5	-1.5				
Sunman	Ripley	23.5	5	25.3	+1.8	26.1	1887	20.2	1884
Vevay	Switzerland	31.4	21	29.9	-1.5				
Worthington	Greene	23.6	6	21.9	-1.7				
Iowa.									
Independence	Buchanan	13.2	13	4.8	-8.4				
Cresco	Howard	8.9	16	-0.8	-9.7				
Monticello	Jones	14.8	34	6.7	-8.1	32.9	1880	3.6	1875
Kansas.									
Independence	Montgomery	27.8	17	24.4	-3.4	45.8	1880	18.6	1886
Wellington	Sunman	25.0	10	23.6	-1.4	40.4	1880	17.6	1886
Yates Centre	Woodson	22.3	8	20.9	-1.4	35.9	1880	15.8	1886
Louisiana.									
Point Pleasant	Tensas	46.7	8	45.0	-1.7				
Grand Coteau	Saint Landry	50.2	6	51.6	+1.4				
Mandeville	St. Tammany	49.3	4	53.2	+3.9				
Maine.									
Gardiner	Kennebec	17.6	52	12.3	-5.3			7.1	1844
Maryland.									
Cumberland	Alleghany	30.5	16	26.6	-3.9	39.0	1880	25.0	1881, '86
Massachusetts.									
Somerset	Bristol	26.2	18	19.4	-6.8			19.4	1888
Michigan.									
Kalamazoo	Kalamazoo	21.2	13	16.5	-4.7	36.3	1880	16.1	1884
Nevada.									
Carson City	Ormsby	32.0	9	26.7	-5.3				
New Jersey.									
Moorestown	Burlington	28.8	25	25.4	-3.4	38.7	1880	22.2	1867
New York.									
Factoryville	Tioga	20.4	6	18.3	-2.1	22.7	1887	18.5	1888
North Volney	Oswego	21.2	20	14.1	-7.1	31.8	1880	15.1	1881
Palermo	Oswego	20.6	35	11.6	-9.0	29.3	1863	11.6	1887
Ohio.									
North Lewisburg	Champaign	23.8	57	24.1	+0.3				
Wauseon	Fulton	18.0	18	17.5	-0.5	37.7	1880	12.2	1875
Tiffin	Seneca	22.2	3	22.5	+0.3	33.7	1887	20.5	1886
Oregon.									
Albany	Linn	38.3	9	33.9	-4.4	43.8	1887	33.9	1888
Eola	Polk	37.2	18	31.8	-5.4				
Pennsylvania.									
Corry	Erie	19.6	8	17.9	-1.7	23.9	1882	16.4	1884
Dyersburg	Wayne	20.7	24	15.5	-5.2	30.7	1880	15.4	1875
Wellaborough	Sumter	24.2	10	20.8	-3.6	35.2	1880	19.1	1884
South Carolina.									
Stateburg	Sumter	44.1	7	46.0	+1.9	49.4	1882	39.0	1886
Tennessee.									
Milan	Gibson	33.0	6	35.0	+2.0				
Texas.									
New Ulm	Austin	50.0	16	46.5	-3.5	63.7	1880	43.1	1881
Virginia.									
Bird's Nest	Northampton	39.5	18	36.4	-3.1	49.4	1880	33.7	1881
Dale Enterprise	Rockingham	28.8	8	34.0	+5.2	34.7	1880	20.7	1881
Variety Mills	Nelson	24.0	11	32.2	+8.2	44.9	1880	28.7	1886
Wytheville	Wythe	34.7	23	35.2	+0.5	41.0	1876	29.1	1886
West Virginia.									
Helvetia	Randolph	32.2	12	32.8	+0.6	43.1	1880	26.1	1881

Table of comparative maximum and minimum temperatures for January.

State or Territory.	Stations.	For 1888.		Since establishment of station.				Length of record.
		Max.	Min.	Max.	Year.	Min.	Year.	
Alabama.....	Mobile.....	72.7	23.0	78.0	1882	11.0	1886	18
Do.....	Montgomery...	76.0	17.5	78.5	1882	5.4	1886	16
Arizona.....	Yuma.....	78.6	27.0	80.0	1879	22.5	1883	13
Do.....	Fort Grant.....	66.6	19.2	77.0	1879	10.0	1883	9
Arkansas.....	Fort Smith.....	71.0	1.2	72.7	1887	6.9	1886	6
Do.....	Little Rock.....	75.0	7.0	78.0	1880	4.8	1878	9
California.....	Los Angeles.....	71.0	30.9	82.0	1883	30.0	1880	11
Do.....	San Francisco...	62.8	28.9	72.9	1887	36.0	1876, 1883	17
Colorado.....	Denver.....	76.0	20.3	67.0	1882	29.0	1875	17
Do.....	Pike's Peak.....	25.3	22.8	30.0	1879	37.0	1883	15
Connecticut.....	New Haven.....	53.2	4.4	63.0	1876	14.0	1873	16
Dakota.....	Bismarck.....	40.0	37.0	49.0	1880	43.6	1887	14
Do.....	Deadwood.....	.....	.....	62.0	1883	30.0	1883	11
Dis. of Columbia	Washington City	53.5	9.2	71.0	1874, 1876	14.0	1881	18
Florida.....	Cedar Keys.....	77.0	29.3	77.0	1880	15.5	1886	9
Do.....	Pensacola.....	71.0	26.1	73.6	1882	14.9	1886	9
Georgia.....	Augusta.....	77.8	22.6	79.0	1879	6.0	1886	16
Do.....	Boise City.....	61.2	27.8	61.5	1884	27.0	1883	11
Illinois.....	Chicago.....	72.6	0.3	70.0	1880	16.0	1884	17
Do.....	Indianapolis.....	43.6	16.8	65.0	1876	20.0	1875	16
Indiana.....	Fort Sill.....	59.8	6.0	69.0	1876	25.0	1884	15
Indian Ter.....	Dubuque.....	71.0	7.2	75.9	1887	9.0	1879	10
Iowa.....	Des Moines.....	37.0	30.5	62.0	1874	31.5	1887	15
Do.....	Dodge City.....	43.8	27.4	63.0	1880	30.4	1884	10
Kansas.....	Leavenworth.....	69.0	18.0	72.9	1887	20.0	1883	14
Do.....	Louisville.....	54.9	21.1	65.0	1876	29.0	1873	17
Kentucky.....	New Orleans.....	69.0	7.9	71.0	1876	19.5	1884	16
Louisiana.....	Shreveport.....	79.6	28.8	78.0	1879, 1887	15.3	1886	18
Do.....	Eastport.....	75.5	15.0	78.0	1876, 1880	1.3	1886	15
Maine.....	Portland.....	46.8	12.2	51.0	1874	20.0	1874	15
Do.....	Baltimore.....	46.7	12.3	58.0	1876	14.7	1887	17
Maryland.....	Boston.....	49.6	9.2	71.0	1876	6.0	1881	16
Massachusetts.....	Marquette.....	57.0	6.2	69.5	1876	13.0	1882	18
Michigan.....	Grand Haven.....	29.4	21.2	56.0	1880	26.0	1881	14
Do.....	Saint Vincent.....	40.0	5.2	57.0	1880	12.0	1873	16
Minnesota.....	Saint Paul.....	36.0	53.5	39.0	1885	46.0	1885	8
Do.....	Vicksburg.....	34.0	41.2	49.0	1879	35.7	1887	17
Mississippi.....	Saint Louis.....	77.8	17.5	80.0	1879	3.1	1886	16
Missouri.....	St. Louis.....	67.8	11.5	72.0	1880	21.5	1884	18
Montana.....	Ft. Assinaboine.	53.3	38.0	46.1	1885, 1886	49.3	1886	8
Do.....	Helena.....	56.5	41.0	57.0	1885	34.0	1883	8
Nebraska.....	North Platte.....	66.2	34.6	70.0	1880	26.8	1885	14
Do.....	Omaha.....	51.3	25.2	62.0	1879, 1880	32.0	1884	16
Nevada.....	Winnemucca.....	49.6	25.8	57.2	1887	23.0	1883	9
New Hampshire.....	Mt. Washington.....	.....	.....	42.0	1874	50.0	1885	17
New Jersey.....	Atlantic City.....	53.4	2.5	64.0	1880	3.0	1875	15
New Mexico.....	Santa Fe.....	57.5	2.0	76.0	1879	13.0	1883	16
New York.....	Buffalo.....	49.0	6.0	65.5	1874	13.5	1884	16
Do.....	New York City.....	44.2	1.9	64.0	1876, 1880	6.0	1886	17
North Carolina.....	Charlotte.....	72.8	17.2	71.0	1885	0.6	1886	10
Do.....	Wilmington.....	75.1	20.0	77.0	1879	9.0	1884	18
Ohio.....	Cincinnati.....	64.2	6.0	69.0	1876	12.4	1886	18
Do.....	Sandusky.....	54.0	1.6	64.0	1880	16.5	1879	11
Oregon.....	Portland.....	62.0	2.0	60.0	1886	3.0	1875	15

Table of comparative maximum and minimum temperatures, &c.—Cont'd.

State or Territory.	Stations.	For 1888.		Since establishment of station.				Length of record.
		Max.	Min.	Max.	Year.	Min.	Year.	
Do.....	Roseburg.....	71.1	6.0	66.0	1885	12.0	1883	11
Pennsylvania.....	Pittsburgh.....	61.0	3.0	75.0	1874	12.0	1875	15
Do.....	Philadelphia.....	56.2	2.4	67.0	1876	5.0	1875	18
Rhode Island.....	Block Island.....	55.0	3.0	58.8	1885	4.0	1882	8
South Carolina.....	Charleston.....	76.0	26.0	80.0	1879	10.5	1886	15
Tennessee.....	Knoxville.....	70.3	12.2	74.0	1876	16.0	1884	18
Do.....	Memphis.....	74.5	6.2	73.0	1876, 1880	8.0	1886	16
Texas.....	Brownsville.....	77.6	21.4	87.6	1887	18.0	1881	13
Do.....	Fort Elliott.....	77.1	14.2	81.0	1880	12.0	1883	9
Utah.....	Salt Lake City.....	52.8	16.7	54.0	1879	20.0	1883	14
Virginia.....	Lynchburg.....	73.7	14.0	72.0	1879	4.0	1877	15
Do.....	Norfolk.....	73.4	16.2	80.0	1871	8.0	1879	18
Washington.....	Spokane Falls.....	51.5	30.5	51.2	1887	27.7	1883	7
Do.....	Olympia.....	56.0	1.8	59.0	1885	9.0	1883	11
Wisconsin.....	La Crosse.....	34.0	42.0	59.0	1874	43.0	1873	16
Do.....	Milwaukee.....	36.7	22.7	59.0	1874, 1874	25.0	1875	18
Wyoming.....	Cheyenne.....	63.6	27.2	63.0	1880	38.0	1875	15

TEMPERATURE OF WATER.

The following table shows the temperature of the sea-water for January, 1888, observed, under conditions as given, at the harbors of the several stations; the monthly range of water temperature; the average depth at which the observations were made, and the mean temperature of the air:

Station.	Temperature at bottom.				Mean temperature of air at the station.	Average depth of water in feet and tenths.
	Max.	Min.	Range.	Monthly mean.		
Canby, Fort, Wash*.....	.....	.....	.....	.....	.....	.....
Cedar Keys, Fla.....	69.5	52.4	17.1	60.5	59.3	7.4
Charleston, S. C.....	55.5	48.5	7.0	51.3	51.0	35.4
Eastport, Me.....	49.4	34.2	6.2	37.0	37.7	16.6
Galveston, Tex.....	58.4	38.8	19.6	49.7	49.8	14.8
Key West, Fla.....	75.2	70.3	5.2	73.7	71.8	18.7
New York City.....	36.4	30.2	6.2	33.3	25.9	13.7
Pensacola, Fla.....	63.6	54.8	8.8	57.7	55.8	17.2
Portland, Me†.....	.....	.....	.....	.....	.....	.....
Portland, Oregon†.....	44.6	32.0	12.6	37.5	30.0	56.0

* Not received. † Thermometer out of order. ‡ 21 days; river frozen from 15th to 24th, both inclusive.

PRECIPITATION (expressed in inches and hundredths).

The distribution of precipitation over the United States and Canada for January, 1888, as determined from the reports of about eight hundred stations, is exhibited on chart iv. In the table of miscellaneous meteorological data are given, for each Signal Service station, the total precipitation, with the departures from the normal. The figures opposite the names of the geographical districts in columns for mean temperature, precipitation, and departures from the normal, show respectively the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the precipitation is below the normal, and subtracting when above.

In New England, the middle Atlantic and west Gulf states, and in the upper Mississippi, Missouri, and Ohio valleys, the rainfall of January, 1888, was about normal; it was slightly below normal in the Lake region and Rio Grande Valley, and decidedly below in the Florida Peninsula, south Atlantic and east Gulf states. On the Pacific coast the rainfall was above the normal, the most marked excess occurring in southern California, where the normal was exceeded by about 80 per cent. In the south Atlantic and east Gulf states only about 65 per cent. of the normal amount fell, and in the Florida Peninsula less than 20 per cent. of the normal amount fell. In northwestern California the monthly rainfall was very heavy, several voluntary observers in Humboldt county reporting more than 12 inches. Mr. W. H. Roscoe, voluntary observer at Upper Mattole, in the county named, reports a

monthly rainfall of 41.63, of which about 32 is reported to have fallen in the last six days of the month, more than 10 inches being recorded on one day, the 30th. The record from Upper Mattole shows that rain fell daily from the 1st to the 6th and from the 20th to the 31st, also on the 13th and 14th. Concerning this remarkably heavy rainfall, the following extract is given from a communication received from Lieutenant J. B. Maxfield, Signal Corps, San Francisco, Cal.:

This report shows the enormous rainfall of 41.63 inches for the month, a larger rainfall than any contained in the records of this office for points along the coast which ordinarily show a very large rainfall. The rainfall reports for January from stations near Upper Mattole have been examined and they all show an excessive rainfall. There is, therefore, no reason to doubt the correctness of Mr. Roscoe's record. Upper Mattole is in Humboldt county, near the coast, and its topographical surroundings are favorable for a heavy rainfall.

The records at the stations in northwestern California are not of sufficient length from which to compute normals, and, therefore, no comparison can be made, but the rainfall in that region for the month was, doubtless, largely in excess of the average.

DEVIATIONS FROM AVERAGE PRECIPITATION.

The following table shows for certain stations, as reported by voluntary observers, (1) the average precipitation for a series of years; (2) the length of record during which the observations have been taken, and from which the average has been computed; (3) the total precipitation for January, 1888; (4) the departures of the current month from the average;